



DOCUMENT NUMBER AND REVISION  
**VL-FS-MGLS24064-61C REV. A**  
**(MGLS24064-S-LED04-SCH C-C14)**

DOCUMENT TITLE:  
**SPECIFICATION**  
**OF**  
**LCD MODULE TYPE**

CUSTOMER	
MODEL NUMBER	<b>MGLS24064-61C</b>
CUSTOMER APPROVAL	
DATE	

DEPARTMENT	NAME	SIGNATURE	DATE
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## VARITRONIX LIMITED

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### Specification of LCD Module Type Item No.: MGLS24064-61C

#### 1. General Description

- 240 x 64 dots STN Positive Silver Transflective LCD graphic module.
- Driving scheme: 1/64 duty, 1/8.7 bias.
- Viewing direction: 6 O'clock.
- 'TOSHIBA' T6963C-0101 flat pack or equivalent LCD controller.
- 'TOSHIBA' T6A39 flat pack or equivalent LCD segment drivers.
- 'TOSHIBA' T6A40 flat pack or equivalent LCD common driver.
- 8K byte display SRAM.
- Yellow-green LED04 backlight.

#### 2. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter	Specifications	Unit
Outline dimensions	180.0(W) x 65.0(H) x 16.0 MAX.(D)	mm
Viewing area	132.0(W) x 39.0(H)	mm
Active area	127.15(W) x 33.87(H)	mm
Display format	240(W) x 64(H)	dots
Dot size	0.48(H) x 0.48(W)	mm
Dot spacing	0.05(H) x 0.05(W)	mm
Dot pitch	0.53(H) x 0.53(W)	mm
Weight:	TBD	grams

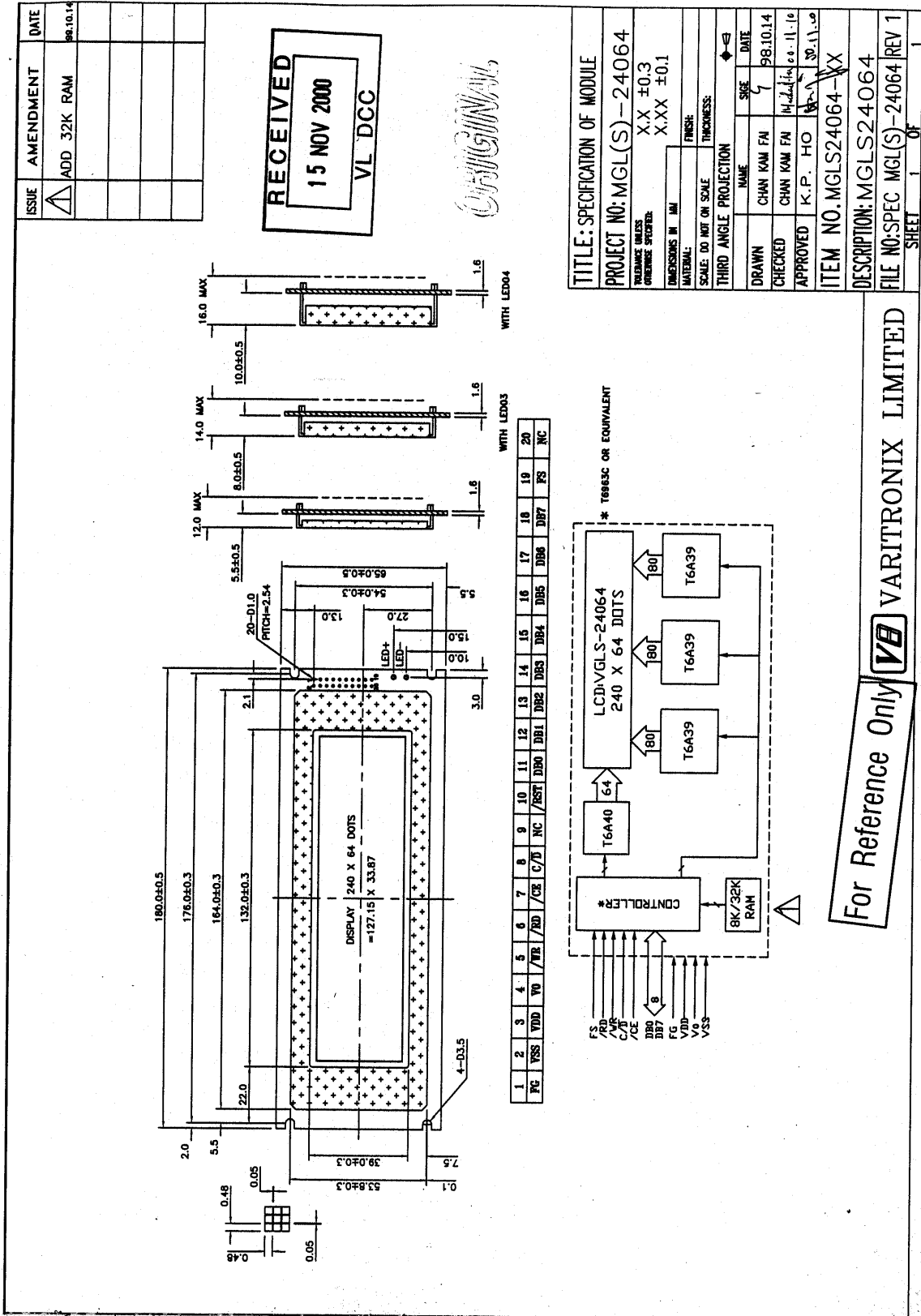


Figure 1: Module Specification

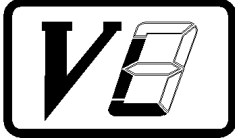


### 3. Interface signals

Table 2

Pin No.	Symbol	Description
1	FG	Frame ground (see note 1).
2	VSS	Ground (0V).
3	VDD	Power supply for logic (+5V).
4	V0	Power supply for LCD drive.
5	/WR	Data write. Write data to controller T6963C when "L".
6	/RD	Data read. Read data from controller T6963C when "L".
7	/CE	Chip enable of controller when "L".
8	C/D	Command/Data read/write. "H" for command read/write and "L" for data read/write.
9	NC	Not connected.
10	/RST	Controller reset when "L".
11	DB0	Data input/output (LSB).
12	DB1	Data input/output.
13	DB2	Data input/output.
14	DB3	Data input/output.
15	DB4	Data input/output.
16	DB5	Data input/output.
17	DB6	Data input/output.
18	DB7	Data input/output (MSB).
19	FS	Font select. "H" for 6 x 8 font & "L" for 8 x 8 font.
20	NC	Not connected.

Note 1: This pin is electrically connected to the metal bezel(frame).  
User can choose to connect this pin to VSS or leave it open.



#### 4. Absolute Maximum Ratings

##### 4.1 Electrical Maximum Ratings(Ta = 25 °C)

Table 3

Parameter	Symbol	Min.	Max.	Unit
Supply voltage (Logic)	VDD - VSS	-0.3	+7.0	V
Supply voltage (LCD drive)	VLCD=VDD – V0	-0.3	+28.0	V
Input voltage	Vin	-0.3	VDD +3.0	V

Note:

The modules may be destroyed if they are used beyond the absolute maximum ratings.

All voltage values are referenced to VSS = 0V.

##### 4.2 Environmental Condition

Table 4

Item	Operating Temperature (To <sub>pr</sub> )		Storage Temperature (T <sub>stg</sub> )		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	0°C	+50°C	-10°C	+60°C	Dry
Humidity	95% max. RH for Ta ≤ 40°C < 95% RH for Ta > 40°C				no condensation
Vibration (IEC 68-2-6) cells must be mounted on a suitable connector	Frequency: 10 ~ 55 Hz Amplitude: 0.75 mm Duration: 20 cycles in each direction.				3 directions
Shock (IEC 68-2-27) Half-sine pulse shape	Pulse duration : 11 ms Peak acceleration: 981 m/s <sup>2</sup> = 100g Number of shocks : 3 shocks in 3 mutually perpendicular axes.				3 directions



## 5. Electrical Specifications

### 5.1 Typical Electrical Characteristics

At  $T_a = 25\text{ }^\circ\text{C}$ ,  $V_{DD} = 5V \pm 5\%$ ,  $V_{SS} = 0V$ .

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	VDD-VSS		4.75	5.0	5.25	V
Supply voltage (LCD)	VLCD =VDD-V0	VDD = 5V, Note 1	14.0	14.5	15.0	V
Input signal voltage	VIN	“H” level	VDD-2.2	-	VDD	V
		“L” level	0	-	0.8	V
Supply current (Logic & LCD)	IDD	Character mode	-	8.7	13.2	mA
		Checker board mode	-	9.4	14.1	mA
Supply current (LCD)	I0	Character mode, Note 1	-	3.4	5.1	mA
		Checker board mode, Note 1	-	3.5	5.2	mA
Supply voltage of yellow-green LED04 backlight	VLED	Forward current =630mA  Number of LED dies =126	3.9	4.1	4.3	V

Note 1: There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.





## 5.2 Timing Specifications

At  $T_a = 0^\circ\text{C}$  To  $+50^\circ\text{C}$ ,  $V_{DD} = 5V \pm 5\%$ ,  $V_{SS} = 0V$

Refer to Fig. 2, the bus timing diagram.

Table 6

Parameter	Symbol	Min.	Max.	Unit
C/ $\bar{D}$ Set-up time	$t_{CDS}$	100	-	ns
C/ $\bar{D}$ Hold Time	$t_{CDH}$	10	-	ns
/CE,/RD,/WR Pulse Width	$t_{CE}, t_{RD}, t_{WR}$	80	-	ns
Data Set-up Time	$t_{DS}$	80	-	ns
Data Hold Time	$t_{DH}$	40	-	ns
Access Time	$t_{ACC}$	-	150	ns
Output Hold Time	$t_{OH}$	10	50	ns

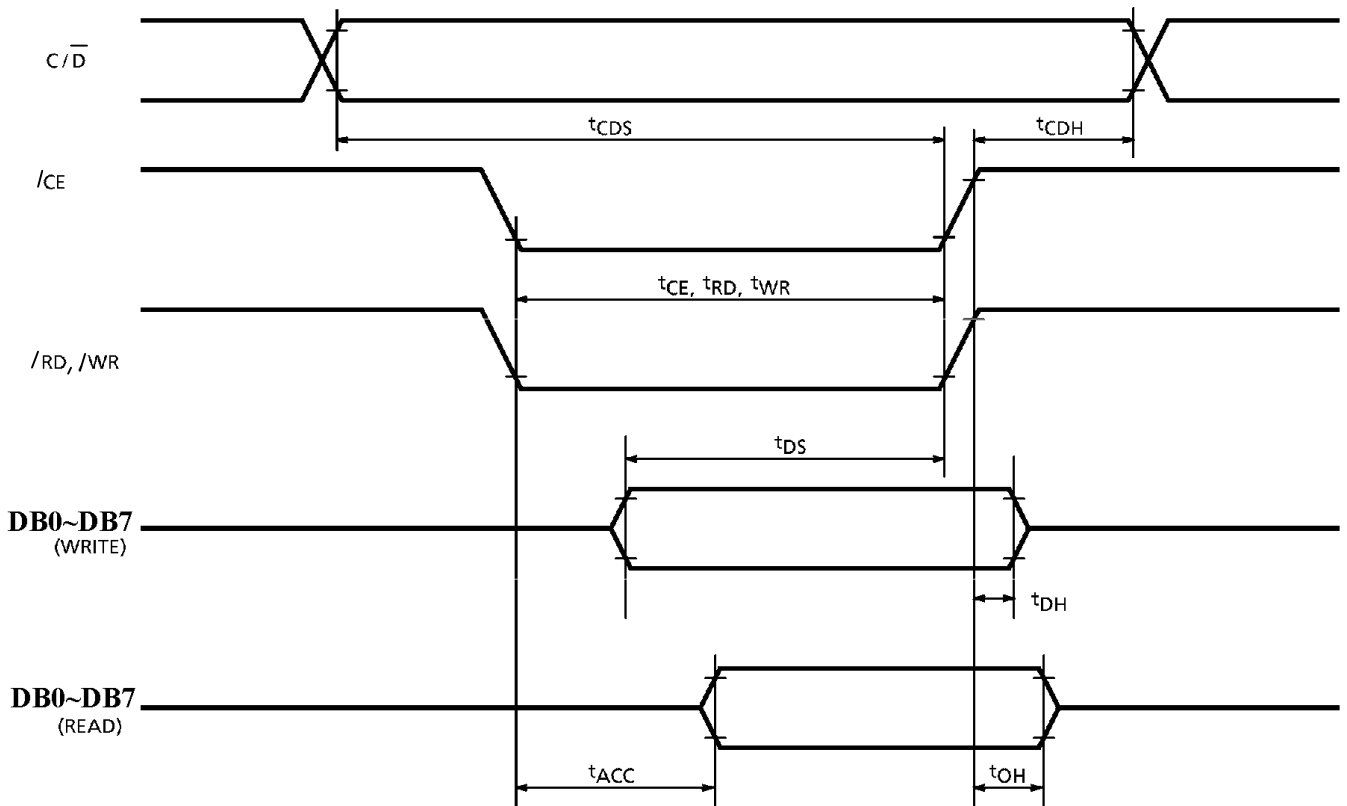


Figure 2: Bus Timing Diagram



### 5.3 Timing Diagram of VDD Against V0.

Power on sequence shall meet the requirement of Figure 3, the timing diagram of VDD against V0.

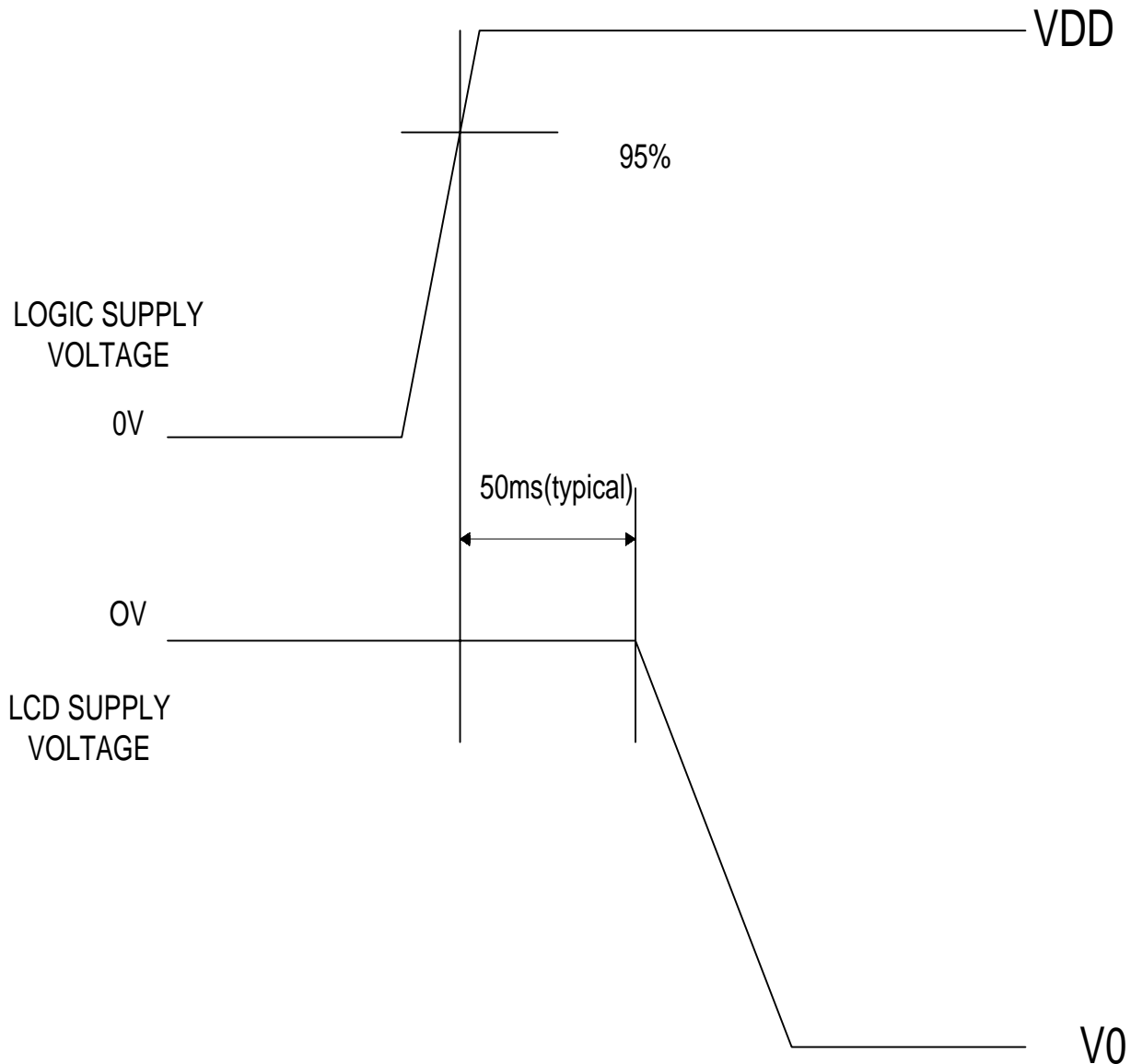


Figure 3: Timing Diagram of VDD Against V0.

“Varitronix Limited reserves the right to change this specification.”

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